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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,326

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Kenji Okada

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EXAMINER

LENIHAN, JEFFREY S

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

09/29/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,326	<b>Applicant(s)</b> OKADA ET AL.	
	<b>Examiner</b> Jeffrey Lenihan	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12/20/2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :12/20/2005, 5/30/2006, 10/15/2007.

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 06/30/2003. The examiner notes, however, that a certified copy of the 2003-188573 application required by 35 U.S.C. 119(b) is not currently listed in the file wrapper for this application.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al, WO99/43719, in view of Buhno et al, JP 08-003412. The examiner notes that Nakagawa et al, US6964999, hereinafter referred to as Nakagawa '999, has been utilized as an equivalent English translation of WO99/43719.

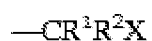
Art Unit: 1796

5. Nakagawa '999 discloses a curable composition comprising a vinyl polymer having at least one terminal (meth)acryloyl group of the following formula



wherein R is defined as a hydrogen atom or an organic group containing 1-20 carbon atoms (Column 3, lines 51-60) (claim 1). Said vinyl polymer may be synthesized from monomers such as (meth)acrylic acids and (meth)acrylic esters (Column 4, line 31 to Column 5, line 19) (claims 3-6), and is characterized by a number average molecular weight from 500 to 100,000 (Column 5, lines 32-38) (claim 18) and a molecular weight distribution of less than 1.8 (Column 5, lines 20-31) (claim 2). Nakagawa '999 teaches that said vinyl polymer may be produced via living radical polymerization methods, preferably atom transfer radical polymerization methods (Column 7, lines 13-19) (claims 7, 8, and 12), using a copper complex as the catalyst (Column 14, lines 50-59) (claims 9-11). Nakagawa '999 further recites the use of thermopolymerization initiators such as azo initiators (Column 23, lines 22-29) (claims 20, 23, and 24), photoradical initiators (Column 22, lines 31-39) (claims 20-22), and chain transfer agents in the production of the vinyl polymer (Column 16, lines 20-27) (claim 17). Silica may also be added to the curable composition as a reinforcing agent (Column 25, lines 27-35) (claim 25).

6. The (meth)acryloyl functional group may be introduced by reacting a polymer having the terminal functional group



Art Unit: 1796

wherein R<sup>1</sup> and R<sup>2</sup> are a group attached to the ethylenically unsaturated group of a vinyl monomer and X is chlorine, bromine, or iodine, with a compound of the formula



wherein R and M are defined as in the instant claims (Column 16, lines 4-19) (claims 12-14). Alternatively, said (meth)acryloyl group may be introduced by reacting a vinyl polymer having a terminal hydroxyl group with a compound of the formula



wherein R and X are given the same definitions as recited in the instant claims (Column 17, lines 3-9) (claim 15); or by reacting a hydroxyl-terminated vinyl compound with a diisocyanate, followed by reaction of the remaining isocyanate group with a compound having the formula



wherein R and R' are given the same definitions as in the instant claims (Column 18, line 65 to Column 19, line 7) (claim 16). The curable composition disclosed by Nakagawa '999 may be used to produce a heat-cured product (Column 32, lines 6-11) well-suited for applications as a pressure sensitive adhesive (Column 32, lines 29-33) (claim 28).

7. Nakagawa '999 recites that antioxidants known in the art may be added to the composition of US6964999 if desired (Column 26, lines 20-23), but does not specifically recite the use of a monoacrylate phenolic antioxidant as recited in the instant claims.

Art Unit: 1796

8. Buhno discloses the use of 0.1-1.5 parts by weight of 2-t-butyl-6-(3-t-butyl-2-hydroxy-5-methylbenzyl)-4-methylphenyl acrylate (abstract, ¶0032) (claims 1, 19, and 26) as an antioxidant in a polymer composition was known in the art at the time of the invention. As noted above, Nakagawa '999 teaches that known antioxidants may be added to the curable composition of US6964999. The examiner notes that it is known in the art that heat-treatment of polymers during processing can cause oxidative degradation, resulting in a decrease in physical/mechanical properties. As the use of antioxidants is known in the art to reduce oxidative degradation in polymers during processing, the examiner takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 2-t-butyl-6-(3-t-butyl-2-hydroxy-5-methylbenzyl)-4-methylphenyl acrylate, as disclosed by Buhno, to the curable composition of Nakagawa '999 for the purposes of inhibiting oxidative degradation of the polymer during thermal curing, thereby producing a cured product having improved mechanical properties (claim 27) as compared to a heat-cured product prepared from a curable composition that did not contain an antioxidant.

9. Claims 1-24 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al, WO99/65963 in view of Buhno et al, JP 08-003412. The examiner notes that Nakagawa et al, US6979716, hereinafter referred to as Nakagawa '716, has been utilized as an equivalent English translation of WO99/65963.

10. Nakagawa '716 discloses a macromonomer comprising a vinyl polymer characterized by a number average molecular weight not less than 3,000 (claim 18), a

Art Unit: 1796

molecular weight distribution of less than 1.8 (Column 3, lines 22-27) (claim 2) which has a carbon-carbon double bond containing group of the following structure at the molecular terminus



wherein R is defined as in general formula (1) of the instant claims (Column 2, lines 21-35) (claim 1). Said macromonomer may be prepared from (meth)acrylic acid and (meth)acrylate ester monomers (Column 4, line 19 to Column 5, line 5) (claims 3-6) via processes such as atom transfer radical polymerization (Column 6, lines 60-65) (claims 7, 8, and 12) using a copper complex catalyst (Column 2, lines 36-45) (claims 9-11). Nakagawa '716 further discloses the use of photo radical initiators (Column 22, lines 39-43) (claims 20-22), thermal polymerization initiators such as azo compounds (Column 21, lines 50-56) (claims 20, 23, 24), and chain transfer agents (Column 21, line 57 to Column 22, line 6) (claim 17) in the synthesis of the vinyl polymer.

11. Nakagawa '716 recites that the (meth)acryloyl functional group as shown in paragraph 10 of this Office Action may be introduced to the terminal of the polymer via the following methods: a) reaction of a vinyl polymer having a terminal group corresponding to general formula (2) of the instant claims with a compound having the same structure as general formula (3) of the instant claims (Column 2, lines 49-67) (claims 12-14); b) reacting a hydroxyl-terminated vinyl polymer with a compound having the same structure as general formula (4) of the instant claims (Column 3, lines 1-8) (claim 15); or c) reacting a hydroxyl-terminated vinyl polymer with a diisocyanate, followed by reaction of the remaining isocyanate group with a compound having the



Art Unit: 1796

same structure as general formula (5) of the instant claims (Column 3, lines 9-20) (claim 16). Nakagawa '716 recites that said macromonomer may be used in the production of heat- or radiation cured materials for use as adhesives (Column 27, lines 14-22) (claim 28).

12. Though not required, Nakagawa '716 discloses that antioxidants known in the art may be added to the curable composition (Column 26, lines 38-41). Nakagawa '716 does not specifically recite the use of a monacrylate phenolic antioxidant as stated in the instant claims.

13. Buhno discloses the use of 0.1-1.5 parts by weight of 2-t-butyl-6-(3-t-butyl-2-hydroxy-5-methylbenzyl)-4-methylphenyl acrylate (abstract, ¶0032) (claims 1, 19, and 26) as an antioxidant in a polymer composition was known in the art at the time of the invention. As noted above, Nakagawa '716 teaches that known antioxidants may be added to the curable composition of US6979716. The examiner notes that it is known in the art that heat-treatment of polymers during processing can cause oxidative degradation, resulting in a decrease in physical/mechanical properties. As the use of antioxidants is known in the art to reduce oxidative degradation in polymers during processing, the examiner takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 2-t-butyl-6-(3-t-butyl-2-hydroxy-5-methylbenzyl)-4-methylphenyl acrylate, as disclosed by Buhno, to the curable composition of Nakagawa '716 for the purposes of inhibiting oxidative degradation of the polymer during thermal curing, thereby producing a cured product having improved

Art Unit: 1796

mechanical properties (claim 27) as compared to a heat-cured product prepared from a curable composition that did not contain an antioxidant.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Lenihan whose telephone number is (571)270-5452. The examiner can normally be reached on Monday through Thursday from 7:30-5:00 PM, and on alternate Fridays from 7:30-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James J. Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Irina S. Zemel/  
Primary Examiner, Art Unit 1796  
/JL/

Jeffrey Lenihan  
Examiner, Art Unit 1796